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Inside This Issue

1 Hyundai's New Global Diagnostic System (GDS)

6 HMA Technicians Show Up Big at 6th World Skill Olympics

7 Module Reprogramming

8 Fix-It-Right

Hyundai's New Global Diagnostic System (GDS)

Hyundai Motor Corporation and Hyundai Motor America are developing a powerful new diagnostic tool. The Global Diagnostic System or "GDS", for short, offers several new features. The tool, referred to as the "Information Terminal" is housed in Panasonic's Toughbook™ laptop and allows diagnosis via wireless communication. When configured properly, the wireless function lets those in a wireless dealership environment to access updates or review the parts dialogue without all the wired connections.

continued on page 2

Hyundai's New Global Diagnostic System

continued from page 1

The GDS is equipped with touch screen technology that simplifies your communication with the unit. The screen can be swiveled and locked into a flat exposed position so that the tool can be handled in a simplified manner.

The GDS in locked flat position

We developed the new tool with the intent of systemizing the diagnostic process. The following stages make up the process:

- Preparation stage: Gathers information about the vehicle and operating conditions for reporting
- Diagnosis stage: Data and DTC analysis functions
- Vehicle S/W Management stage: All ECU related reprogramming or option settings
- Repair stage: Verifies the repair and offers link to parts information

Consider theses stages when approaching diagnosis with the GDS.

Compared to existing scan tools, GDS offers the following distinctive features:

- Coupling between information and diagnosis- The GDS Information Terminal is a computerized system. It is possible to store large amounts of information. Furthermore, it can show the diagnosis results and related information on one screen, in contrast to existing scanners' limitations in output due to their limited screen size.
- Quick Support through internet updates- If new data is introduced or if an error has been generated in the GDS System, data update or system fixes can be made through a real time internet update. Update availability and frequency are increased through the direct internet interface.
- CAN communication support - No need for an additional adaptor, because CAN communications protocol is built-in.
- GDS supports powerful flight recording functions.
- Wireless network support between Vehicle Communication Interface (VCI) and Information Terminal creates greater unit mobility. Multiple users can use the tool without relocating the terminal.

Figure 1

The welcome screen is shown in Figure 1. From here you can choose functions in Preparation, Diagnosis, Vehicle Software Management or Repair. Preparation includes defining the vehicle and parameters being diagnosed. Hot Fix is a new function that searches and displays items from the Hyundai Technical Library that apply to the vehicle, symptom or Diagnostic Trouble Code.

The Diagnosis mode is very powerful and designed with you in mind. We will look more specifically at a few diagnostic functions in this article. Vehicle Software Management Mode facilitates reflashes, VIN rewriting required on some control modules and vehicle software upgrades. The repair mode taps into the Hyundai service knowledge base offering guidance on replacement procedures, part information and circuitry.

To begin a diagnostic session, you can either enter the VIN for the vehicle; or you can select the parameters and systems to be diagnosed in the Preparation mode. Next a vehicle system to be evaluated must be selected. Remember, the tool has a touch screen so selection is easy with the supplied stylus.

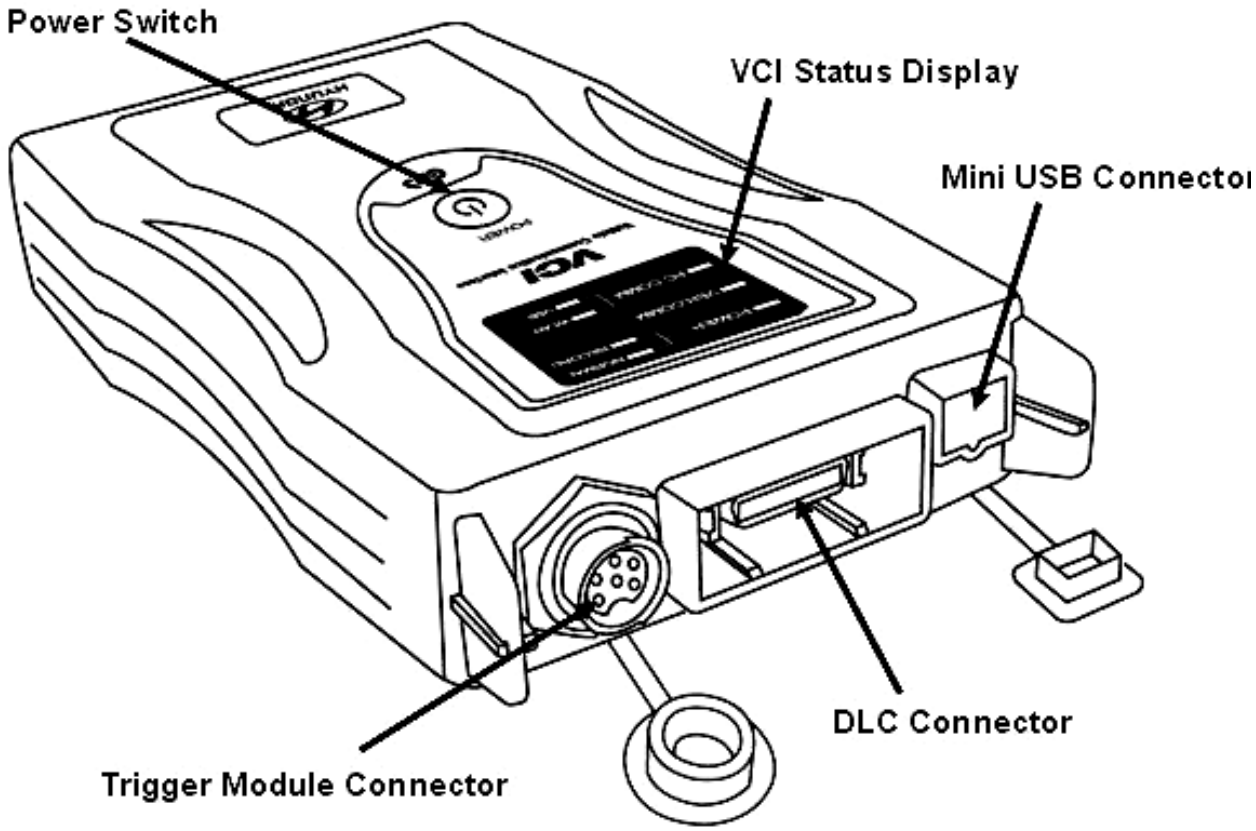


Figure 2

Note: Do not use a ball point or other pen on the touch screen. Any stylus made for touch screen activity will work.

Setting and running "Fault Code Searching" function in the "Vehicle Selection" allows users to continue workflow on the primary system (denoted by a check mark on the vehicle selection process) while the GDS searches in the background for DTCs in all selected systems. The progress status for the Fault Code Searching will be displayed on the top of the "Fault Code Searching" icon, which is located on the lower section of the GDS screen.

First, establish communication with the vehicle. You will need to plug the communication VCI (shown in Figure 2) into the communication port in the vehicle. To turn on the VCI module, depress the main power switch after connecting the main DLC cable from the vehicle to the VCI module.

Note: If the vehicle DLC diagnosis connector does not use a 16-pin connector, or if battery power cannot be supplied to the VCI module, the cigar power cable must be connected to supply battery power to the VCI module with the vehicle's ignition switch in the ACC position.

The VCI will run through a test sequence and when it is ready, green lights will be displayed for "PC Comm" and "Veh. Comm" on the unit. When using a USB connection, the "PC Comm" light will be red.

Note: When the unit is engaged in Flight Recording, its light will appear red.

If communication between the GDS and the vehicle is interrupted, hold down the power button for five seconds.

After you have selected the vehicle information or VIN enter "GO" on the touch screen. This will alert the GDS which vehicle it will be diagnosing. You can also select symptoms from a drop down box or add comments for later review.

Select the Diagnosis mode from the welcome screen. In this mode you can select the various components requiring diagnosis to gather Current Data or Flight Recording. The GDS will return values in real time for Current Data. In the Current Data mode, you can record and display graphs for up to six inputs simultaneously via the Basic Inspection function. The data can then be analyzed. Just click the box next to the appropriate sensors. The GDS can return graphs, component location and descriptions, component specifications, circuit information

In the Flight Record mode, data from the previous ten minutes is recorded when the trigger is activated.

continued on page 4

Hyundai's New Global Diagnostic System

continued from page 3

This becomes helpful for intermittent problems. A condition experienced can be recorded after the fact if you are still within the ten-minute timeframe.

DTC Analysis is a function that runs DTC diagnosis for control modules in a vehicle, and supports specific repair procedures for each DTC. Results appear when DTC diagnosis proceeds through the communication between a VCI and a vehicle control module. DTC list will be shown in the upper section and "Freeze Frame" will be shown in the lower section of the page if the control module in question supports the Freeze Frame function.

If there is no DTC for corresponding control module by DTC diagnosis, message "No Error Code" will appear. If the DTC is found, DTC will be listed on the screen. DTC codes are listed in the first column. DTC name descriptions are listed in the second column. The DTC state (History or Pending) is listed in the third column (State section).

DTC diagnosis updates itself automatically every 25-seconds. It can also be updated manually by selecting "DTC Analysis" on the screen menu at any time. DTC saved in the control module can be erased after the printout of DTC code followed by the DTC analysis function process.

We have just highlighted a few of the powerful features coming with Hyundai's new GDS diagnostic tool. With so much information at your finger tips, thorough diagnosis and repair can be achieved much more efficiently. Its wireless capability improves mobility and simplifies upgrades. This breakthrough system can guide your diagnostic procedures and draws on Hyundai's full service library for tackling the conditions discovered with the tool. Look for future articles walking you through the steps for maximizing the power of GDS.

Figure 3

GDS System Kit Contents

The Hyundai Global Diagnostic System ships with the following components. If you have any questions regarding care or operation of the GDS after consulting the GDS Operation Manual, please contact SPX Kent-Moore at: 1-800-336-6677.

Part name	Part number	Description	Qty.
Software DVD	GHDM – 120000	Software DVD for running the GDS system	2
User Manual	GHDM – 020000	User manual with introduction and instructions for GDS System.	1
Assy.-VCI module	GHDM – 210000	VCI module for scan-tool functions and ECU upgrade. also used with flight record function.	1
Assy.-Trigger module	GHDM – 220000	The trigger module is used to manage the data during the flight record mode in the VCI module, it can also be used as a DC power supply for the VCI module.	1
Cable-Mini USB	GHDM – 230000	Cable for communication between VCI and Information Terminal. Length 4m.	1
Cable-DLC [26pin -16pin]	GHDM – 241000	DLC main cable for communication between VCI module and (16pin) OBD-II diagnosis connector on vehicle. Length 1.5m.	1
Adapter [16pin-20pin(R)]	GHDM – 244000	DLC Adapter cable [16pin to 20pin(R)] for DLC Cable (16-26) and 20-pin diagnosis connector on vehicle. 20pin (R) connector is molded gray color. Length 1.5m. This cable is used for ECU Reprogramming on some Hyundai and KIA vehicles.	1
Adapter [16pin-12pin]	GHDM – 245000	This adapter is connected between DLC main cable [26pin to 16pin] on the VCI module and 12pin diagnosis connecter on some older vehicles. Length 0.2m	1
Cable-Battery Power Extension	GHDM – 24B000	Extension cable for connecting to cigar jack connecter. supplies DC power from the vehicles battery terminals directly. Length 3m.	1
Adapter (10-8-2)	GHDM – 247000	DLC adapter cable for reprogramming and setting RKE. 3 different connectors each 10, 8 and 3pins compose the other side of this 16pin diagnosis connector. This adapter is used with the main DLC cable [26pin to 16pin], while connected to the VCI module. Length 0.2m Used for control modules on some Hyundai vehicles.	1

HMA Technicians Show Up Big at 6th World Skill Olympics

Bow do you prepare to take on the world in showing your automotive technical expertise? This year's team from Hyundai Motor America showed that they have the answers. Team members earned one gold, one silver and one bronze medal from the competition; and the fourth member received an Excellent rating. Prior to the Sixth World Skill Olympics held in Korea, HMA representatives at previously endured through a rigorous selection process in September. The qualification event, The National Troubleshooting Contest dubbed "The Shootout" was based on the Platinum Skills Challenge and Advanced Diagnostics Courses. The Shootout format resembled challenges that would be faced in Korea. With this year's success, that preparation appears to have paid off. No one sent more guys to the podium than the Team USA!

Frank Sura from Van Horn Hyundai of Fond Du Lac, Wisconsin was awarded the Gold Medal in Body Electrical. Frank sailed through the Body Electrical task so easily that he spent most of the task time finished, sitting in a new Accent waiting for the others to complete the job.

In the Engine Systems category, Anthony Dehn representing Family Hyundai in Tinley Park, Illinois took the Silver Medal. The event continues to evolve as evidenced by the Body Exterior category that the team had only learned about at the opening ceremony. Mike White from Mark Thomas Hyundai in Albany, Oregon brought home the bronze. It's pretty cool to medal in a category that you didn't even know was going to be part of the contest. Team USA Coach, Scott Eakin was extremely happy and justifiably so, "I am especially proud to medal in what was probably the single most difficult task of the contest. [Only one contestant was fully successful in the engine systems task.] Our guys did an exemplary job. I could not be more proud to have medalists in 3 of the 5 individual categories."

In the overall rankings, Jeff Lingg from Wilmington Hyundai in North Carolina was one of only eight technicians acknowledged as Excellent. Another fact was notable. The HMA technicians placed in exactly the same order in Korea as they did in the National Troubleshooting Contest.

Congratulations to the team, Coach Scott Eakin, and all who contributed to this year's success!

Left to Right: Frank Surra -Gold Medal Body Electrical; Anthony Dehn - Silver Medal Engine Systems; Mike White - Bronze Medal Body Exterior; and Jeff Lingg – Overall Excellent Rating

Module Reprogramming

Many reprograms are available for automatic transaxle driveability issues. Please refer to the appropriate TSB for further information.

MODEL	ENGINE	YEAR	PROBLEM	TSB	OP CODE	TCM ID
ACCENT	1.6L	2000-02	P0722	03-40-016	95446R0F 45955R0F	2A44-90
		2001-02	P-D or P-R shock	03-40-010	45957R0F	2A44-91
ELANTRA	2.0L	2001-02	2-3 flare	02-40-001	95442R0F	2085-F7
	2.0L	2004	Mild driveline bump	05-40-002	39130F00	C160T0 C160T2 N160T2
	2.0L	2005	P0736	005-40-014	39102F04	N19GT1
	2.0L	2005	P0736	005-40-014	39102F04	C19GT1
SANTA FE	2.4L/2.7L	2004	2-3 & 3-4 firm,quick shift	04-40-018	95440F09	8025-F6 C128-C5 C117-C5
	2.4L & 2.7L	2004	2-3 & 3-4 shift improvement, improved P-R & R-D	05-40-010	95440F09	8205-F6 C128-C5 C117-C5
	2.4L & 2.7L	2004	Driveline bump 2-10 mph	04-40-008	95440F07	8205-F5 C128-C4 C117-C4
	2.7L	2001-04	Shudder 38-42 mph	04-40-007	95440F03	2128-F7 2117-F7 C128-F3 C117-F3
	2.7L	2003-04	VIEC	04-36-017	39109F07	N/A
	3.5L	2004	Non-linear throttle	04-36-012	39106F00	N/A
	3.5L	2003-04	Bump/jerk after vehicle has stopped	04-40-003	95447F01	N/A
SONATA	2.4L & 2.7L	2002 EF	2-3 flare	02-40-003	95443R0F	2159-F4 2161-F4 8135-F4
	2.7L	2002-03	2-3 shift flare on 1st acceleration	04-40-006-1	95440F01	C159-F6 C161-F6
	2.7L	2004	VIEC	04-36-015	39109F06	N/A
TUCSON	2.7L	2005	P0736	05-40-013	95440F14	C302-F5 C304-F5
	2.0L	2005	P0736	05-40-015	39170F01	N59GT1
TIBURON	2.7L	2003-04	VIEC	04-36-016	39109F08	N/A
	2.0L	2005	P0736	05-40-015	39102F04	N59FT1
XG	3.0L	2001	2-3 flare	02-36-011	39125R0F 10B011A1	8105-F2
	3.0L	2001	4-5 shudder	04-40-004	45002R0F	8105-C3
	3.0L	2002	3-4 shudder	02-40-004	39139R9F	8105-C2

Fix-It-Right

AUTOMATIC TRANSAXLE - NO MOVEMENT IN DRIVE OR REVERSE GEAR

MODEL: ALL

DESCRIPTION:

If you are servicing a vehicle with no movement in drive or reverse gear, follow the procedure shown below:

REPAIR PROCEDURE:

1. Check for DTC in both the "Engine" and "Automatic Transaxle" menus:

- If DTC are found, refer to TSB 05-40-008 or 04-40-020 for repair guidance.
- If no DTC are found, go to Step 2.

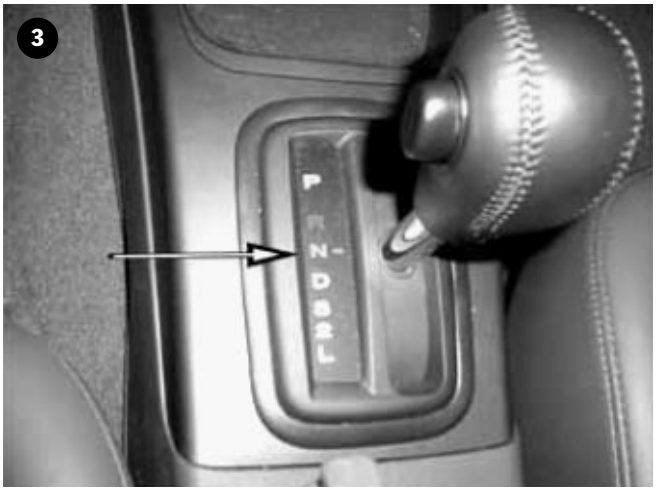
2. Remove the dipstick and check the ATF for a **strong burnt smell**. If the smell does not provide conclusive results, remove the oil pan and check for metal particles in the pan:

- If a strong burnt smell or metal particles are found, replace the transaxle
- If not, go to Step 3

NOTE: ATF that is a dark brown or black color does not indicate an internal transaxle concern; do not replace the transaxle. SPIII may change color to a dark brown after 10,000 to 25,000 miles in service. This change is normal for this type of ATF.

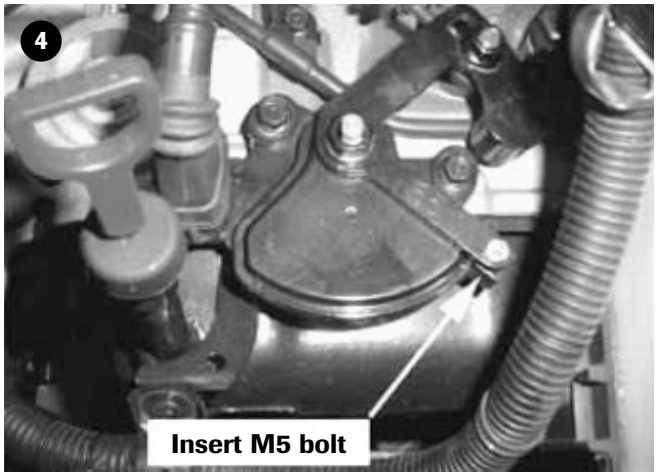
VERIFY THE RANGE SWITCH ADJUSTMENT:

3. Move the shift lever to "N".

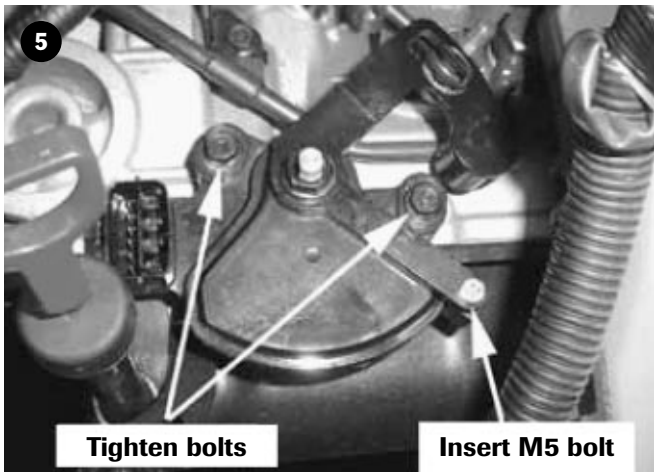


4. Insert a 5 mm drill or M5 (5 mm) bolt in the adjustment hole of the range switch. Check that the drill or bolt fits into the adjustment holes.

- If not, go to Step 5
- If so, go to Step 9



5. Loosen the two 10 mm mounting bolts.



6. Disconnect the shift cable at the lever.

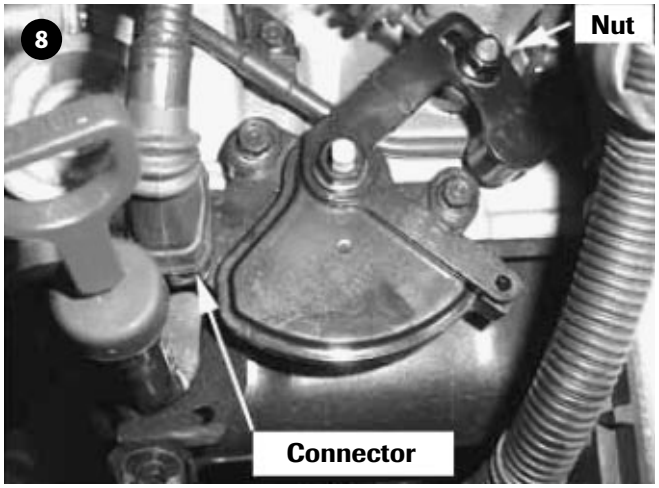
7. Insert a 5 mm drill or M5 (5 mm) bolt in the adjustment hole of the range switch. Tighten the two 10 mm mounting bolts to specification.

Specification: 7-8 ft.lb
(10-12 Nm, 100-120 kg.cm)

8. Move the shift lever to the "N" position. Attach the shift cable to the lever and install the nut. Tighten the nut to specification.

Specification: 9-10 ft.lb (12-13 Nm, 120-130 kg.cm)

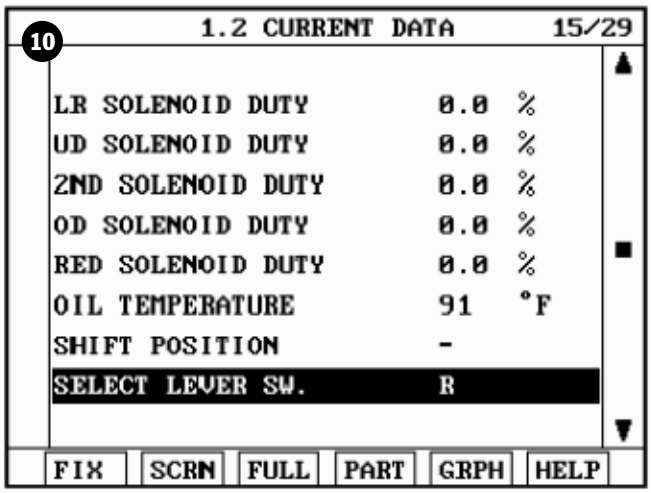
Remove the 5 mm drill or M5 bolt.



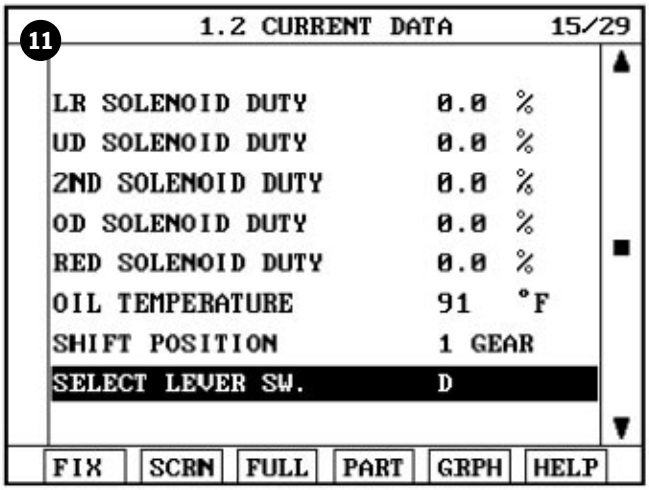
VERIFY THE SIGNAL FROM THE RANGE SWITCH:

9. Attach a Hi-Scan Pro and select:
- "Hyundai Vehicle Diagnosis"
- Vehicle
- "Automatic Transaxle" menu
- "Current Data" menu
- "Select Lever Switch" and "Shift Position:

10. Move the shift lever to Reverse.
- Monitor "Select Lever Switch".
- If "R" is displayed, the TCM is receiving the correct signal from the range switch. Go to Step 11.
- If not, check the connector at the TCM and the range switch for a bent pin or pin not fully inserted. Check the wiring harness for an open or short circuit. If ok, replace the range switch.


10
1.2 CURRENT DATA 15/29
LR SOLENOID DUTY 0.0 %
UD SOLENOID DUTY 0.0 %
2ND SOLENOID DUTY 0.0 %
OD SOLENOID DUTY 0.0 %
RED SOLENOID DUTY 0.0 %
OIL TEMPERATURE 91 °F
SHIFT POSITION -
SELECT LEVER SW. R
FIX SCRN FULL PART GRPH HELP

11. Move the shift lever to Drive.
- Monitor "Shift Position" and "Select Lever Switch".
- If "D" and "GEAR 1" are displayed, the TCM is receiving the correct signal from the range switch. Go to Step 12.
- If not, check the connector at the TCM and the range switch for a bent pin or pin not fully inserted. Check the wiring harness for an open or short circuit. If ok, replace the range switch.


11
1.2 CURRENT DATA 15/29
LR SOLENOID DUTY 0.0 %
UD SOLENOID DUTY 0.0 %
2ND SOLENOID DUTY 0.0 %
OD SOLENOID DUTY 0.0 %
RED SOLENOID DUTY 0.0 %
OIL TEMPERATURE 91 °F
SHIFT POSITION 1 GEAR
SELECT LEVER SW. D
FIX SCRN FULL PART GRPH HELP

12. Install the A/T Tester, P/N 09450- AT000, to the vehicle:
- Shift the transaxle to "D". Move the gear selector switch of the A/T Tester and shift manually in 1, 2, 3, 4, and 5 gears (if equipped).

NOTE: Use the "EF, XG" switch for side-pan transaxles and the "LC" switch for bottom-pan transaxles.

- Disconnect the A/T Tester from the solenoid. Do not reconnect the harness connector to the solenoid. Shift the transaxle to "R".
- If no movement, replace the transaxle.
- If the vehicle moves, check the harness connector at the TCM and the solenoid for a bent pin or pin not fully inserted. Check the wiring harness for an open or short circuit.
- If no problem is found, swap a TCM from a similar vehicle and test for movement in Drive and Reverse. If the vehicle moves in Drive and Reverse, replace the TCM.

WARRANTY INFORMATION:

Applicable Warranty Applies.

Fix-It-Right

continued from page 9

OCCUPANT CLASSIFICATION SYSTEM (OCS) SMART BUFFER FEATURE REMOVALRE PROGRAMMING–WARRANTY 073

MODEL: 2004-2005 ELANTRA.

IMPORTANT: DEALERS MUST PERFORM THIS SERVICE ON ALL AFFECTED VEHICLES PRIOR TO CUSTOMER RETAIL DELIVERY AND WHENEVER AN AFFECTED VEHICLE IS IN THE SHOP FOR ANY MAINTENANCE OR REPAIR.

IMPORTANT: WHEN A VEHICLE ARRIVES AT THE SERVICE DEPARTMENT, ACCESS HYUNDAI MOTOR AMERICA'S "WARRANTY VEHICLE INFORMATION" SCREEN VIA DCS INTERACTIVE OR DCS ON-LINE TO IDENTIFY OPEN WARRANTY.

DESCRIPTION:

In certain situations, the Occupant Classification System (OCS) installed in the right front seat of a 2004 or 2005 Elantra may misclassify a Child Restraint Seat (CRS) as an adult. This may occur if the CRS is installed after an adult has been seated in the right front seat, if there has not been a key ON - key OFF cycle with the right front passenger seat empty prior to installation of the CRS.

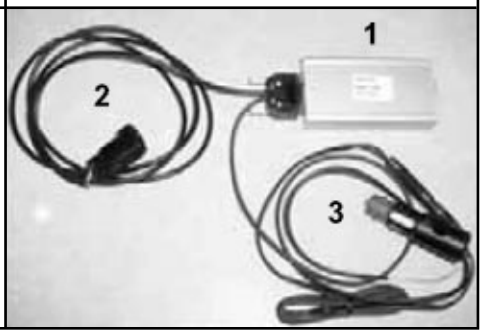
This article provides the procedures to use the OCS reprogramming tool to reprogram the vehicle's OCS Electronic Control Unit (ECU) to remove the feature that may cause the CRS to be recognized as an adult.

VEHICLES AFFECTED:

- Model: 2004-2005 ELANTRA vehicles
- Affected vehicle production date range: June 12, 2003 through September 9, 2005

TOOLS REQUIRED:

One initial OCS reprogramming tool will be provided to your dealership free of charge to perform this service. Replacement tools will be available mid November, 2005, through your facing Parts Distribution Center (PDC) at a cost of $299.00.

PART NAME	OCS Reprogramming Tool
PART NUMBER	00305-CMP00-73
CONTENTS	1. Reprogramming Box 2. OCS Cable 3. Power Adapter
PHOTO	

SERVICE PROCEDURE:

NOTE:

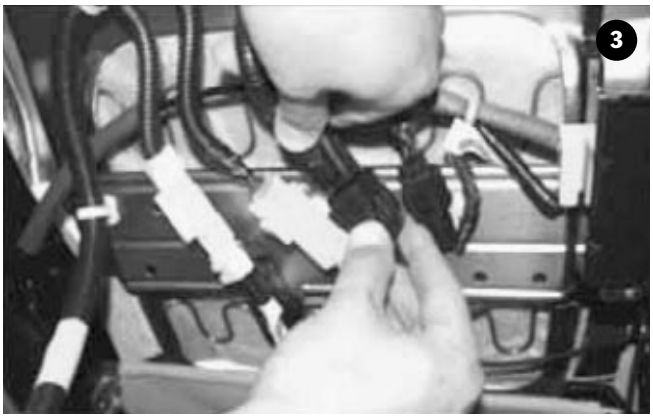
- **Verify that the vehicle is affected by accessing Hyundai Motor America's "Warranty Vehicle Information" screen via DCS interactive or DCS on-line to identify an open 073 warranty on the vehicle.**
- **Be careful not to disconnect any cables connected to the vehicle or the tool**

1. Open the right front door.

2. Turn the ignition switch to the OFF position.

CAUTION: Do not turn the ignition switch to the "ON" position.

3. Locate the OCS 3-pin connector under the front passenger seat pan and unplug the OCS connector by pushing on the locking tab and pulling the connector housing.

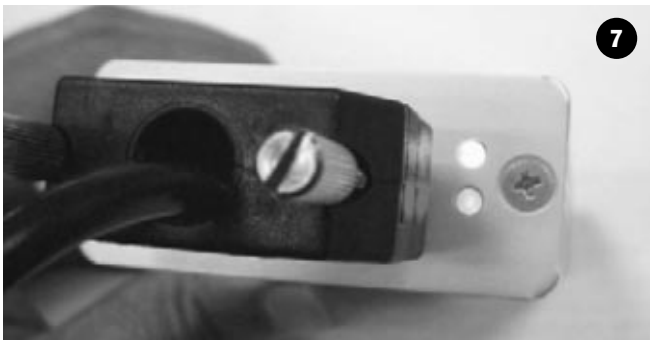


4. Connect the OCS cable to the vehicle's OCS connector under the front passenger seat.

5. Connect the power adapter to the cigarette lighter outlet.

6. Turn the ignition switch to the "ACC" position. The LEDs on the reprogramming b ox will illuminate to verify that power is connected.

7. After the initialization phase (approximately 3 seconds), both LEDs - red and green - will be steadily illuminated, indicating that the box is ready to start the programming.



8. Press and release the black button on the back of the box to start the reprogramming.

9. The reprogramming takes approximately 10 seconds. During this time, both LED lights will blink alternately.

10. When the reprogramming is complete, the GREEN LED light will blink 4 times and then stay illuminated to indicate that the reprogramming has been successful.

11. If the **RED** LED light blinks 4 times and then stays illuminated, the reprogramming was unsuccessful.

Check the following:

• Verify proper connection of the reprogramming tool cable to the vehicle's OCS connector.

continued on page 12

Fix-It-Right

continued from page 11

• The power supply (voltage) at the cigarette lighter outlet may be too low.

Check the two conditions above. Disconnect the power adapter from the cigarette lighter outlet and reconnect to reset the reprogramming tool. Start the reprogramming procedure again. Go to Step #6 after successful programming.

12. Turn the ignition to the OFF position.

13. Disconnect the reprogramming tool.

14. Reconnect the OCS connector under the right front passenger seat.

15. Check for diagnostic codes (DTC) using the Hi-Scan Pro. Erase all trouble codes.

WARRANTY CLAIM INFORMATION:

OP CODE	OPERATION	OP TIME
51B040R0	OCS Reprogramming	0.2 M/H

TechNet Trivia

Trivia Question: Which came first, the FAX machine or the automobile?

Last issue's Trivia Answer: The correct chronological order is — First U.S. Toll Road: 1792, First Spark Plug: 1860; FIrst Auto Insurance Policy: 1897, World War I: 1914-1918, First Powered Windshield Wipers: 1923.

TechNet Times

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TechNet Times is published monthly by Hyundai Motor America's National Service Technology Department for Hyundai Dealership Technicians. The subjects covered in this publication are often one of a kind items, but they may help you to solve similar incidents. In all cases, the diagnostic procedures recommended in the Shop Manuals should always be performed first.

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